

Remarks/Arguments

Reconsideration of the application is respectfully requested. Claims 1, 2, 6 – 8, 11 – 15, 17 – 27, 33, 35 - 46 are pending in this application. Claims 6 – 10, 13, 21 – 26 are withdrawn from consideration.

In the Office Action, the Examiner rejected Claims 1, 2, 11, 12, 14, 15, 17-20, 27, 33, and 35-46 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,004,538 to Hughes et al. (“Hughes”) in view of U.S. Patent No. 4,568,540 to Asano et al. (“Asano”).

I. Examiner Interview

Applicants’ representative would like to thank Examiner Fubara for the courtesies extended in the telephonic interview held on Jun 7, 2011 with Examiner Fubara, Dr. Angelica Magnus, and undersigned counsel. We discussed the fact that Hughes discloses phosphonic acids as chelating agents, whereas Applicants claim phosphonic acids as precipitating agents. The Examiner requested that Applicants show the structure of the phosphonic acids set forth in Hughes in order to show how they are different from the structure(s) claimed. No agreement was reached.

II. Rejection of Claims 1, 2, 11, 12, 14, 15, 17-20, 27, 29, and 33-43 in view of Hughes and further in view of Asano

The Examiner considers that Hughes discloses the claimed composition, and while teaching that the composition can be acidic, does not specifically teach a pH of from 1.5 to 3.5 or from 2 to 3. Asano is cited for teaching that the dentifrice composition should be maintained at an acidic pH of 3.5 to 6 in order to permit the fluoride to remain in solution instead of precipitating. The Examiner considers a pH range of from 3.5 to 6 to overlap a pH range of from 1.5 to 3.5 so that it would have been obvious to modify the pH of the Hughes composition with the expectation of maintaining the fluoride and zinc ions in solution, as taught by Asano. Based upon the proposed combination of references, the Examiner further considers the artisan would have been motivated to maintain the pH of the composition at acidic pH in order that the fluoride can be maintained in solution as a low pH is expected to maintain the fluoride and zinc ions in solution. For the reasons set forth below, the rejection is respectfully traversed.

The claimed invention is directed to liquid compositions for desensitizing teeth which comprise a non-polymeric acid according to the formula shown in claim 1, an organic polymer

with carboxyl and/or hydroxyl groups, a film forming component, and a solvent. The compositions have a pH of 2-3.

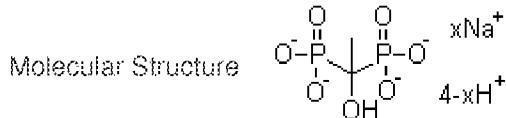
It was found that the simultaneous use of an acid and a polymer comprising hydroxyl and/or carboxyl groups causes the dentinal tubules to be practically completely occluded ([0112] of published application No. 20040062743) which reduces the sensitivity of the teeth. It is assumed that the acid causes co-precipitation of the polymer, proteins and calcium thus forming massive plugs within the tubules ([0114] of published application).

The invention is not rendered obvious by Hughes. Hughes teaches the use of chelating agents as an optional component of denture cleansing compositions (col. 11, line 13 ff). Chelating agents are said to be beneficial because they "aid cleaning and bleach stability by keeping metal ions, such as calcium, magnesium, and heavy metal cations in solution" (col. 12, lines 1-3). Thus, while the present invention requires the use of acids having calcium-precipitating properties [0013], Hughes teaches the use of chelating agents which keep calcium ions in solution, i.e. prevent the precipitation of these ions. This is the opposite of the teaching of the present invention.

It is therefore not surprising that the polyphosphonates and aminopolyphosphonates taught by Hughes (col. 12, lines 3-18) have a different structure than the claimed phosphonic acids. The compounds of Hughes have chelating properties while the acid according to the formula of the present invention have calcium precipitating properties. The differences between the chelating compounds of Hughes and the acids of the invention are summarized as follows:

1) Hughes (col 12 line 8)

Name 1-Hydroxyethanediphosphonic acid sodium salt
Synonyms 1-Hydroxyethane-1,1-diphosphonic acid sodium salt

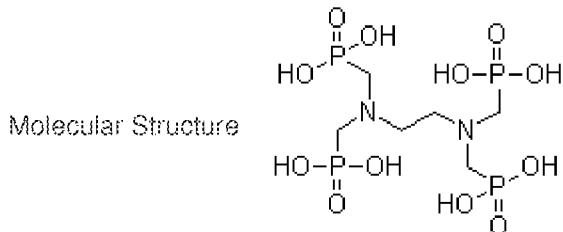


Molecular Formula C₂H₆O₇P₂xNa
CAS Registry Number 29329-71-3
EINECS 249-559-4

This is not covered by Claim 1 since **n** can not be 2.

2) Hughes (col 12 line 8 and col 12 line 44)

Name Ethylenebis(nitrilodimethylene)tetraphosphonic acid
Synonyms [1,2-Ethanediylbis[nitrilobis-(methylene)]]tetrakis-phosphonic acid; EDTMP

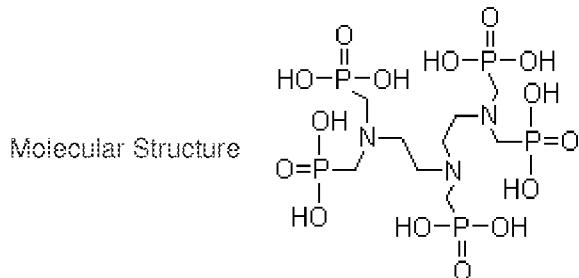


Molecular Formula C₆H₂₀N₂O₁₂P₄
Molecular Weight 436.12
CAS Registry Number 1429-50-1

This is not covered by Claim 1 since **R** is a hydrocarbon radical not an amine.

3) Hughes (col 12 line 9)

Name Diethylenetriaminepenta(methylene-phosphonic acid)
Synonyms [(Phosphonomethyl)imino]bis[2,1-ethanediyl]nitrilobis(methylene)]tetrakis-phosphonic acid; DTPMP



Molecular Formula C₉H₂₈N₆O₁₅P₅
Molecular Weight 573.20
CAS Registry Number 15827-60-8

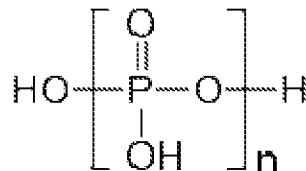
This is not covered by Claim 1 since **R** is a hydrocarbon radical not an amine.

4) Hughes (col 12 line 7)

Polyphosphates

Wikipedia:

Polyphosphates are salts or esters of polymeric oxyanions formed from tetrahedral PO_4 (phosphate) structural units linked together by sharing oxygen atoms.



Polyphosphoric acid

This is not covered by Claim 1 since **R** has to be at least 1 C-atom.

5) Hughes (col 12 line 7)

Amino-Polyphosphates: Reference is made to US Patent No. 3541046:

United States Patent Office

3,541,046

Patented Nov. 17, 1970

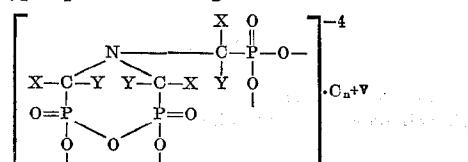
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3,541,046
ORGANO-AMINO-POLYPHOSPHONATES AS
FLAME RETARDANTS FOR POLYMERS
Al F. Kerst, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo., a corporation of Delaware
No Drawing. Filed Sept. 11, 1968, Ser. No. 759,250
Int. Cl. C08f 45/60, 45/62
U.S. Cl. 260—45.8
13 Claims

2

in the present invention are partial anhydrides of organo-amino-polyphosphonates having the formula:

(1)

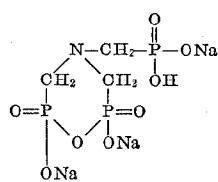


10 In the above formula X and Y are each selected from the group consisting of hydrogen and hydrocarbyl groups containing from 1 to 6 carbon atoms. These hydrocarbyl groups are preferably alkyl groups which can be either straight chain or branched chain and may either be substituted or unsubstituted. As examples of substituents which may be utilized, there may be mentioned halides (fluoride, chloride, bromide and iodide), hydroxy, sulfonyl and the like.

15 In the above formula C_x+V generically designates cations which include metal ions (e.g. alkali metal ions—Na, K, Rb, Cs, Fr; alkaline earth metal ions—Ba, Sr, Ca, Mg; and metals such as Fe, Zn, and Mn), hydrogen ions, ammonium ions, organic ammonium ions having the formula $(-\text{NR}_4^+)$ wherein R is an alkyl group contain-

ABSTRACT OF THE DISCLOSURE

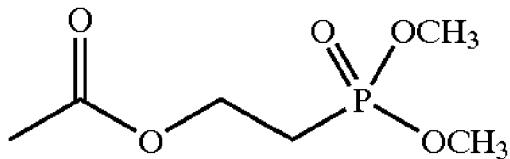
The invention relates to polymeric compositions containing partial anhydrides of organo-phosphonates which include such a compound as shown below:



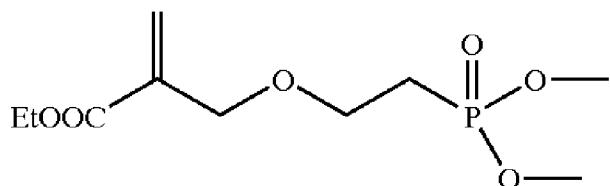
This is not covered by Claim 1 since **R** is a hydrocarbon radical not an amine.

Phosphonic acids claimed by the invention:

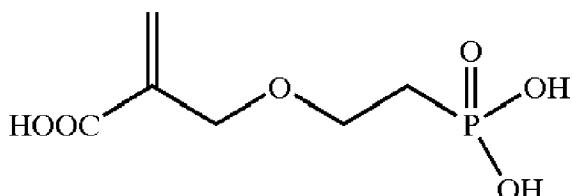
Examples:



Page 3 [0059]



Page 3 [0060]



Page 5 [0070]

For further examples please see page 5 [0071]

As shown, the polyphosphonates and aminopolyphosphonates suggested by Hughes are not suitable for the claimed compositions and therefore the claimed subject matter is not rendered obvious by Hughes. None of the cited references teach the composition, as claimed. Thus, the proposed combination of Hughes and Asano would not render obvious the presently claimed invention.

Accordingly, it is believed that claims 1, 2, 11, 12, 14, 15, 17-20, 27, 29, and 33-43 specify patentable subject matter and are now in condition for allowance. Applicants therefore respectfully request favorable reconsideration and allowance of this application. The Examiner is requested to telephone applicant's attorney at the number listed below if it will advance the prosecution of this case.

Respectfully submitted,

Dated: June 28, 2011

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